

**ARIZONA DEPARTMENT OF WATER RESOURCES**

**SURFACE WATER MANAGEMENT DIVISION**

**Dam Safety Section**



**REQUIREMENTS**

**DURING AND FOLLOWING CONSTRUCTION**

**OF**

**HIGH AND SIGNIFICANT HAZARD DAMS**

## **INTRODUCTION**

This guide regarding the requirements during and following construction has been prepared to facilitate the applicant's understanding and compliance with Arizona law. Any omissions or errors do not relieve the applicant from complying with applicable sections of Arizona Revised Statutes Title 45-Waters, Chapter 6 and Arizona Administrative Code Title 12-Natural Resources, Chapter 15-Department of Water Resources.

Arizona Revised Statute (A.R.S.) 45-1202 places all dams, unless specifically exempt, under supervision by the Arizona Department of Water Resources (Department). In accordance with A.R.S 45-1203, 1206 and 1207, and Arizona Administrative Code (A.A.C.) R12-15-1207(A), written approval of an owner's application is required prior to construction of a new dam or enlargement, repair, alteration, or removal of an existing dam. Application requirements differ according to the hazard potential of the dam. A.A.C. R12-15-1212 in conjunction with A.A.C. R12-15-1208 specifies requirements that must be followed during construction of a new high or significant hazard dam, or the reconstruction, repair, enlargement, or alteration of an existing high or significant hazard dam. A.A.C. R12-15-1213 specifies the requirements following completion of construction of a new high or significant hazard dam, or the reconstruction, repair, enlargement, alteration, or removal of an existing high or significant hazard dam.

A.A.C. R12-15-1212 in conjunction with A.A.C. R12-15-1210 through 1211 specify the construction and post-construction requirements for low or very low hazard dams. This guide only addresses the requirements for high and significant hazard dams.

## **REQUIREMENTS DURING DAM CONSTRUCTION**

In accordance with A.R.S. 45-1207 and A.A.C. R12-15-1207(F), an approval to construct a new dam, or repair, enlarge, alter, breach, or remove an existing dam is valid for one year. If construction does not begin within one year, the approval is void. Upon written request and good cause shown by the owner, the Department may extend the time for commencing construction. The Department must review the application again in light of changes that may have occurred since the approval was originally given and grant another approval. An applicant may not start construction before the Director reviews the application for changes and grants another approval.

### **Pre-construction Conference**

In accordance with A.R.S. 45-1207 the applicant must provide the Director notice of the construction start by registered mail at least 10 days before the start. Before commencement of construction activities, the owner must invite to a pre-construction conference all involved regulatory agencies, the prime contractor, and all subcontractors in accordance with A.A.C. R12-15-1212. At this meeting the Department will identify, to the extent possible, the key construction stages at which an inspection will be made. At least 48 hours before each key construction stage identified for inspection, the owner or the owner's engineer must provide notice to the Department. From the Department's perspective, the conference provides a final forum for communication of regulatory requirements so that the contractor can plan construction activities accordingly.

### **Construction Control**

The owner and the owner's engineer must supervise or direct the supervision of construction of a new dam or reconstruction, repair, enlargement, alteration, breach, or removal of an existing dam complying with the construction quality assurance plan in accordance with A.A.C. R12-15-1212. Failure to perform the work in accordance with the application approved by the Department renders the approval revocable in accordance with A.A.C. R12-15-1212. The owner's engineer must exercise professional judgment independent of the contractor, and be a registered professional engineer licensed in Arizona with proficiency in engineering and knowledge of dam technology.

The Department will periodically inspect construction to confirm that it is proceeding according to the approved design and to confirm that the owner's engineer is exercising proper construction control. The owner's engineer must submit summary reports of construction activities and test results according to a schedule approved by the Department. The owner (or the owner's engineer) must remedy any unsatisfactory condition with the contractor.

The Department must have access to the dam site in accordance with A.A.C. R12-15-1214 for purposes of inspecting all phases of construction including (but not limited to) the foundation, embankment, concrete placement, inspection and test records, and mechanical installations.

The owner must immediately report to the Department any condition encountered during construction that requires a deviation from the approved plans and specifications. The owner must promptly submit a written request for approval of any necessary change and sufficient information to justify the proposed change. The owner may not commence construction without the written approval of the Director unless the change is a minor change. A minor change is a change that complies with rules and provides equal or better safety performance.

## REQUIREMENTS FOLLOWING COMPLETION OF DAM CONSTRUCTION

In accordance with A.R.S. 45-1209 and A.A.C. R12-15-1212, upon completion of construction, the owner must notify the Department in writing to that effect. The Department will make a final inspection as soon as practicable. The owner must correct any deficiencies noted during the final inspection as soon as possible. The Department may conduct a follow-up inspection and confirm that the deficiencies have been corrected. Use of the reservoir requires written permission from the Department.

Within 90 days of completion of construction of high and significant hazard dams, A.R.S. 45-1209 and A.A.C. R12-15-1213 require that the owner file the following:

- An affidavit showing the actual cost of construction. Attach a detailed accounting of the costs of construction, including all engineering costs (see paragraph below on **Fee Requirements**). A sample affidavit is included in this section.
- An additional fee or refund request, as appropriate based on the actual cost of construction (see the section below on **Fee Requirements**).
- One set of full sized as-constructed drawings, in the form of paper prints, sealed by the engineer who supervised and approved the construction. As-constructed plans must show confirmation survey points and elevations, for the dam and appurtenant structures, made during and after completion of construction. If changes were made to the approved drawings during construction, supplemental drawings showing the dam and appurtenances as actually constructed must be included.
- Construction records, including grouting, materials testing, and locations and baseline readings for permanent benchmarks and other instrumentation, initial surveys, and readings.
- Photographs of construction from exposure of the foundation to completion of construction.
- A brief completion report summarizing the salient features of the project, including a description of the causes for any changes or deviations from the approved drawings and specifications which were made during the construction phase.
- A schedule for filling the reservoir, specifying fill rates, water level elevations to be held for observation, and a schedule for inspecting and monitoring the dam. The owner must monitor the dam monthly during the first filling.
- An operating manual for the dam and its appurtenant structures. The operating manual must include a process for safety inspections prescribed in A.A.C. R12-15-1219. The operating manual must also include schedules for surveillance activities and baseline information for any installed instrumentation as follows:
  - a. The frequency of monitoring,
  - b. The data recording format,
  - c. A graphical presentation of data, and
  - d. The person who will perform the work.
  - e. Evaluation of collected data.

In accordance with A.R.S. 45-1209 and A.A.C. R12-15-1214, upon review and approval of these items and finding that construction has been conducted in accordance with the approved plans and specifications and finding that the dam is safe, a License of Approval will be issued by the Director unless a license currently in effect requires no changes. Use of

the reservoir requires written permission from the Director.

### **Fee Requirements**

Upon completion of the project, the total actual costs related to construction shall be tabulated and an affidavit of Total Cost shall be filed with the Department, in accordance with A.R.S. 45-1209(C), A.A.C. R12-15-1213 and A.A.C. R12-15-151(B)(11). The filing fee shall be recomputed for the total cost in accordance with the Example Final Fee Calculation as shown below, and payment shall be made for the difference between the fee already paid and the recomputed fee. In accordance with A.R.S. 45-1209(C), no License of Final Approval shall be issued until a completed affidavit and the final filing fee is received and approved by the Department.

The fee is based upon the total project costs associated with construction of the dam and appurtenant works integral to the design and safe operation of the dam. Preliminary investigations and surveys, engineering designs, the Department's application requirements, administration and supervision of construction, and any other engineering costs related to construction shall also be included.

If the recomputed fee for actual total costs exceeds the estimated fee paid with the application filing by \$50.00 or more, then the owner must pay the difference between the fee already paid and the recomputed fee. If the recomputed fee is less than the original fee by an amount of \$50.00 or more, then the owner is entitled to a refund by the amount of the difference between the fee already paid and the recomputed fee.

A refund may be obtained by written request including supporting documentation. The Department will review the final cost statement and initiate the refund process if a refund is indicated.

### Example Final Fee Calculation

Based upon the actual total costs the fee will be computed according to the following schedule:

- For the first \$100,000 of the cost, two (2 %) percent.
- For the next \$400,000, one and one-half (1.5 %) percent.
- For the next \$500,000, one (1 %) percent.
- For all costs in excess of \$1,000,000, one-half of one (0.5 %) percent.

#### ESTIMATED FEE CALCULATION FOR SUBMITTAL WITH THE APPLICATION:

ESTIMATED COST.....	\$6,420,000.00
2% x \$100,000.....	2,000.00
1.5% x \$400,000.....	6,000.00
1% x \$500,000.....	5,000.00
0.5% x \$5,420,000.....	27,100.00
ESTIMATED FEE.....	<u>\$40,100.00</u>

#### RECOMPUTED FEE CALCULATION FOR ACTUAL PROJECT COST IN ACCORDANCE WITH THE AFFIDAVIT OF TOTAL COST:

ACTUAL COST.....	\$6,482,500.00
2% x \$100,000.....	2,000.00
1.5% x \$400,000.....	6,000.00
1% x \$500,000.....	5,000.00
0.5% x \$5,482,500.....	27,412.50
RECOMPUTED ACTUAL FEE.....	<u>\$40,412.50</u>
Original Estimated Fee.....	- 40,100.00
ADDITIONAL FEE.....	<u>\$312.50</u>

In the example the owner would be required to pay an additional fee of \$312.50. If the actual cost were \$6,320,000.00, then the recomputed fee would be \$39,600.00. The difference of \$500.00 would be an over payment and the owner would be entitled to a refund of \$500.00.

## Place On Applicant's Letterhead

Arizona Department of Water Resources  
Surface Water Management Division  
Dam Safety Section  
500 North Third Street  
Phoenix, Arizona 85004-3903

Director:

I, \_\_\_\_\_ am the \_\_\_\_\_  
(Name) (Owner or Authorized Agent of Owner)  
of the \_\_\_\_\_  
(Name of Dam and Reservoir)

The final actual total cost of the construction (or enlargement, repair, alteration, or removal, as appropriate) of the dam and appurtenant works to completion thereof is as follows:

\* 1. **ENGINEERING**

1.1	Preliminary investigations, surveys and design .....	\$ _____
1.2	Final investigations, surveys, design, and ADWR application requirements .....	\$ _____
1.3	Contract administration, construction supervision .....	\$ _____
1.4	Construction quality control testing .....	\$ _____

***TOTAL ENGINEERING*** ..... \$ \_\_\_\_\_

\* 2. **CONSTRUCTION CONTRACT PAYMENTS**

**	2.1	Final payment for contract bid quantity list .....	\$ _____
**	2.2	Final payment for change orders to bid quantity list .....	\$ _____

***TOTAL CONSTRUCTION CONTRACTS*** ..... \$ \_\_\_\_\_

***TOTAL CONSTRUCTION COST*** (Engineering + Construction Contracts) .... \$ \_\_\_\_\_

I hereby declare under penalty of perjury that, to the best of my knowledge and belief, the above statement is true and correct.

Executed on \_\_\_\_\_ at \_\_\_\_\_, Arizona.

\_\_\_\_\_  
(Owner's Signature)

\_\_\_\_\_  
(Notary)

\_\_\_\_\_  
(Date)

- \* The cost breakdown must include all applicable costs as indicated. For projects with two or more features, an allocation of total project cost items to each appropriate feature may be made. Allocations of project cost items may be combined when properly identified to fit the individual circumstances.
- \*\* Attach forms showing contract bid quantities with prices and final pay quantities, including Change Order items.